

BRIEFER ARTICLES

SAGENOPTERIS, A MESOZOIC REPRESENTATIVE OF THE HYDROPTERACEAE

(WITH ONE FIGURE)

The question of the botanical relationship of the genus *Sagenopteris* has been a debated one for a great many years. The genus was founded by PRESL in 1838 for a Rhaetic (upper Triassic) form from south Germany, and since that time a considerable number of species have been described from all over the world, all of which come from rocks of Mesozoic age. The genus has been discussed by SCHIMPER, NATHORST, BERRY, and SEWARD. Nearly all students have recognized its pteridophytic affinities, and many have suggested a relationship with the so-called water ferns (Hydropteraceae). NATHORST was the most emphatic advocate of the latter relationship, which was based upon habit and venation of the vegetative parts. He fortified it by his discovery in the Rhaetic beds near Palsjö in Sweden of fruitlike bodies, which, aside from their resemblance to the sporocarps of the modern *Marsilea*, did not represent the fruits of any known Coniferophyte or Cycadophyte present in the Rhaetic flora of Sweden, and therefore were considered to be the sporocarps of *Sagenopteris*, being found in association with the fronds of *S. undulata* Nathorst.

Somewhat similar remains, considered to represent the sporocarps of *Sagenopteris*, have been recorded by ZIGNO from the Jurassic of Italy, and by HEER from the Upper Cretaceous of western Greenland (HEER referred the latter to *Marsilea*). In describing the Lower Cretaceous of Maryland in 1911, I considered the evidence sufficiently good to warrant referring the Potomac species of *Sagenopteris* to the Hydropteraceae. The most abundant of these Potomac species, and the only one at all well characterized, namely *S. elliptica* Fontaine, has been found to have a considerable geographic range. It is not only present in the Patuxent formation (the oldest member of the Potomac group), but occurs also in the Patapsco formation, which there is good evidence to consider to be of Albian age. This species has also been recorded from the Knoxville and Horsetown beds of California, the Kootenay formation of Montana, and the Lower Cretaceous of Queen Charlotte Islands.

The occasion for the present note is the presence of this species (*S. elliptica* Fontaine) in the lower part of the Blairmore formation of western Canada, in association with characteristic sporocarps which are almost identical with those described by NATHORST from much older

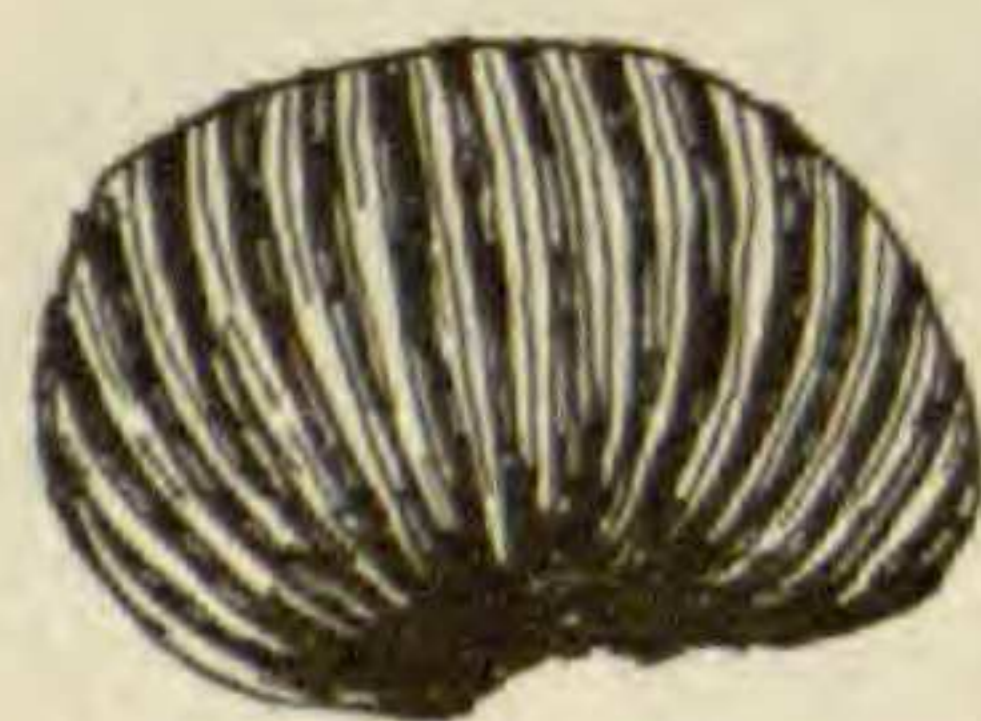


Fig. 1.—Sporocarps of *Sagenopteris canadensis*; $\times 4$.

beds on the other side of the world. The supposed sporocarps from the Blairmore formation (fig. 1) probably belong to the same botanical species as *S. elliptica*, but in view of the fact that this has not been demonstrated, and in accordance with paleobotanical usage, they may be named ***Sagenopteris canadensis***, sp. nov. It may be remarked parenthetically that not all of the recognized species of *Sagenopteris* based upon foliar remains are clear cut, the European Jurassic *S. Phillipsii* being not obviously different from *S. rhoifolia*, or from the European Lower Cretaceous *S. Mantelli*. The last is scarcely, if at all, to be distinguished from, and has often been confused with, the American *S. elliptica*.

The sporocarp, which it is believed belongs to the latter, may be described as follows: Sporocarp hard and resistant, stalked, bean-shaped, gibbous, slightly flattened at the sides, more recurved and slightly more narrowly rounded at one end, about 5 mm. in length, and about 3 mm. in height, with fifteen or sixteen transverse encircling veins which are impressed, and appear as sulcae in the material, retaining more carbonaceous matter because thicker, and appearing blacker than the remainder of the wall; bands between these impressed veins lighter in color, and with a thin central line more or less developed.

SEWARD in his latest work refers *Sagenopteris* to the Hydropteraceae tentatively, summing up his remarks with the statement that "decisive evidence as to its position in the plant kingdom is at present lacking; the inclusion of the genus as a possible member of the Hydropterideae has still to be justified."

It would seem that the discovery of bodies that have all the megascopic features of sporocarps, that cannot be referred to any other known elements of the associated flora, in association with foliage, which in habit, form, and venation independently suggests comparisons with the genus *Marsilea*, at two such remote localities as Sweden and western Canada, is strong presumptive proof of relationship. Moreover, these two occurrences are very different in age, thus showing no obvious change in the sporocarps during the time that elapsed between the Rhaetic and the mid-Cretaceous, a time interval of at least several million years, and comparable in magnitude with the time that has elapsed from the mid-Cretaceous to the present. If these sporocarps preserve their appearance during the older interval, this conservative feature becomes an argument of validity in comparing their latest occurrence with the *Marsilea* sporocarps of the present.

The evidence, then, that *Sagenopteris* is related to the recent Hydropteraceae is about as conclusive as we can hope to secure in the absence of structural material, which is present in about 0.0001 per cent of the cases with which the paleobotanist has to deal.—EDWARD W. BERRY, *Johns Hopkins University, Baltimore, Md.*

A BISPORANGIATE SPOROPHYLL OF *LYCOPODIUM LUCIDULUM*

(WITH ONE FIGURE)

The occurrence of more than a single sporangium on a sporophyll in *Lycopodium* is so unusual that it is believed the following account will be of interest.

BOWER¹ records a case in which a sporophyll of *L. rigidum*, from a specimen in the Glasgow University Herbarium, bears "two sporangia of slightly unequal size placed side by side. They are individually smaller than the average sporangia in the near neighborhood on the same axis." BOWER's statement would hold equally true for a similar case in *L. lucidulum* recently found in the writer's laboratory. As will be noted from fig. 1, the larger of the sporangia shows the normal kidney shape typical of the sporangium of *Lycopodium*, while the smaller has more the form of a football. The relative thicknesses of the two stalks correspond closely to the size of the sporangia. Both stalks are slightly lateral to the

¹ BOWER, F. O., Note on abnormal plurality of sporangia in *Lycopodium rigidum* Gmel. *Ann. Botany* 17:278-280. figs. 18. 1903.